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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/438,491	11/12/1999	TOSHIYUKI YOSHIHARA	684.2935	9399

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NEW YORK, NY 10112

EXAMINER

SCHWARTZ, JORDAN MARC

ART UNIT	PAPER NUMBER
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2873

DATE MAILED: 12/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/438,491

Applicant(s)

YOSHIHARA, TOSHIYUKI

Examiner

Jordan M. Schwartz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/30/03 and RCE filed 9/02/03.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-10, 12-17, 19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2 and 4-10 is/are allowed.
- 6) ☒ Claim(s) 3, 12, 13, 16, 17, 19 and 20 is/are rejected.
- 7) ☒ Claim(s) 14 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 3 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In reference to claims 3 and 13, that part of the claims stating "said plurality of optical elements is used selectively" renders the claims vague and indefinite. Specifically, all lens elements are used within an optical system for some required purpose and therefore all lens elements are being used "selectively". It is therefore not clear as to applicant's intended meaning and the lack of clarity renders the claims vague and indefinite. The assumed meaning for purposes of examination is that "said plurality of optical elements are used selectively to change the aberration" (similar to what is originally claimed) however, further clarity is required.

Claim Objections

Claim 12 is objected to for the following reason. Since the intended meaning could be determined from what is set forth in the specification and the figures, a 112 rejection was not made but instead this lack of clarity issue is being raised in the following claim objection.

Specifically, "the wafer" (in lines 4 and 9) lacks an antecedent basis since applicant has amended "a wafer" (in line 1) to "a substrate". It is therefore suggested that applicant change the references to the "wafer" to the "substrate" which is the assumed meaning for purposes of examination.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 12-13, 17 and 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsuji et al patent no 5,424,552.

Tsuji et al reads on these claims by disclosing the limitations therein including the following: a projection optical system for projecting a device pattern of a mask onto a substrate (column 5, line 45 to column 6, line 32, column 12, line 49 to column 13, line 24) comprising a projection optical system being disposed between the mask and the substrate (Figure 36, "PL"); an optical element for correcting aberration disposed between the mask and the substrate (Figure 36, element "340" and column 57, lines 29-59); the optical element having a refractive power in one direction of two orthogonal directions and no refracting power in the other of two orthogonal directions (column 57, line 50 re lens "340" as cylindrical); and the optical element disposed between the mask and the substrate (Figure 36). Tsuji et al further discloses this lens element as rotating (Figure 36, column 57, line 50). An optical axis can be described in terms of x,y, and z planes within which the optical axis lies. By rotating an optical element relative to an optical axis, the element will inherently be inclined relative to one of the planes of the optical axis and therefore will inherently be "inclined with respect to an optical axis". Specifically, if one considers the up and down direction of Figure 36 as the "y plane",

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then by rotating element "340", the element will be inclined relative to the x and z planes of the optical axis and will therefore be "inclined relative to the optical axis". Tsuji et al further discloses a plurality of these optical elements (column 57, line 50 re cylindrical lenses "340" and "341") and the lenses used selectively to change the aberration (column 57, lines 50-59). It is believed that the optical element "333" will inherently have an optical power as claimed in claim 17, this being reasonably based upon Tsuji disclosing this lens to reduce aberrations. Tsuji et al further discloses an illumination system for illuminating the mask (column 6, line 3); and a method for transferring a device pattern onto a wafer (Figure 36 and column 5, line 46 to column 6, line 32).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuji et al in view of Matsumoto et al.

Tsuji et al discloses as is set forth above including the lens for use in a projection exposure apparatus (abstract) and the projection exposure apparatus using an excimer laser as the light source (column 47, lines 47-58, column 11, line 26) but does not specifically disclose the lens composed of either quartz or fluorite. Matsumoto et al teaches that in a projection exposure apparatus using an excimer laser as a light source (paragraphs 0001 and 0005) that it is desirable to use lens elements of either or both

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quartz and fluorite in order to provide improved imaging with the use of an excimer laser of the patterned mask onto the substrate (paragraphs 0001 and 0005). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the projection exposure apparatus of Tsuji et al comprising either quartz or fluorite since Matsumoto et al teaches that in a projection exposure apparatus using an excimer laser as a light source, that it is desirable to use lens elements of either or both quartz and fluorite in order to provide improved imaging with the use of an excimer laser of the patterned mask onto the substrate.

Allowable Subject Matter

Claims 2 and 4-10 are allowed.

Claim 3 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 14-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: with respect to the allowable subject matter, none of the prior art either alone or in combination disclose or teach of the claimed combination of limitations to warrant a rejection under 35 USC 102 or 103.

Specifically, with reference to claims 2-10, none of the prior art either alone or in combination disclose or teach of the claimed aberration changing optical system

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comprising an optical element being rotatable about a rotational axis, which is an optical axis of the optical system, and being tiltable relative to the optical axis and specifically further with the optical element having different refractive powers in two orthogonal directions or having a refractive power in one of two orthogonal directions and no refractive power in the other of the two orthogonal directions. Specifically, with reference to claim 14, none of the prior art either alone or in combination disclose or teach of the claimed projection system for projecting a pattern onto a substrate comprising a projection optical system as claimed, an aberration correcting optical element having the refractive power as claimed, disposed between the pattern and substrate, being inclined with respect to an optical axis, and specifically further a second optical element having the structure and positioning as claimed in claim 14. Specifically, with reference to claim 15, none of the prior art either alone or in combination disclose or teach of the claimed projection system for projecting a pattern onto a substrate comprising a projection optical system as claimed, an aberration correcting optical element having the refractive power as claimed, disposed between the pattern and substrate, being inclined with respect to an optical axis, and specifically further a parallel flat plate being inclined with respect to the optical axis and being in an opposite direction to the claimed optical element.

Response to Arguments

Applicant's arguments filed July 30, 2003 have been fully considered but they are not persuasive. Applicant's arguments concerning the Morooka, Omura, and Tokuda references are persuasive and therefore these rejections have been withdrawn. The

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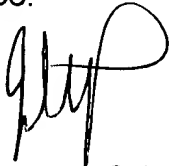
examiner had stated in the interview of July 28, 2003 that the proposed changes would require additional consideration concerning particularly the Tsuji et al reference. Upon further consideration the examiner believes that the art is still applicable. Applicant argues that the cylindrical lenses of Tsuji neither describe nor suggest the claimed features of claim 12. Upon further consideration the examiner believes that Tsuji does describe the claimed features as per the rejection above. Specifically, applicant is claiming that the claimed optical element is "inclined with respect to an optical axis" and states that this is neither described nor suggested by the rotated lens. However, as stated in the rejection above, by rotating an optical element relative to an optical axis, the element will inherently be inclined relative to one of the planes of the optical axis and therefore will inherently be "inclined with respect to an optical axis". Specifically, if one considers the up and down direction of Figure 36 as the "y plane", then by rotating element "340", the element will be inclined relative to the x and z planes of the optical axis and will therefore be "inclined relative to the optical axis".

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jordan M. Schwartz whose telephone number is (703) 308-1286. The examiner can normally be reached on Monday to Friday (8:00-5:30), alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached at (703) 308-4883. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read 'JMS', with a large loop at the end.

Jordan M. Schwartz
Primary Examiner
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November 18, 2003